SEQ Day 1

Your Name________________________________

Partner’s Name________________________________

• You will study students’ solutions to algebra equations. You should:
  1. Describe each student’s solution to your partner and finish labeling their steps.
  2. Talk about the answers to the questions and then write your final answers.
  3. Sometimes you will solve a problem using one of the student’s ways.

• Sometimes, you will solve some problems on your own.
SEQ Day 1
SEQ Day 1

Alex solved the following problems using the **distribute-first** way. Complete the step labels in the blank spaces provided below.

<table>
<thead>
<tr>
<th>Alex’s distribute-first way:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(x – 3) = 8</td>
</tr>
<tr>
<td>2x – 6 = 8</td>
</tr>
<tr>
<td>2x = 14</td>
</tr>
<tr>
<td>x = 7</td>
</tr>
</tbody>
</table>

Distributed 2

Added _________ on Both

Divided by _________ on Both

1. How do you know that Alex solved the problem correctly?
Alex’s **distribute-first** way:

\[
\begin{align*}
4(x + 2) &= 12 \\
4x + 8 &= 12 \\
4x &= 4 & \text{Distributed} \\
x &= 1 & \text{Subtracted on Both} \\
\end{align*}
\]

2. Why did Alex subtract on both sides as the second step?

GP1. **Solve** the following equation using Alex’s **distribute-first** way.

\[
6(x - 2) = 18
\]
Alex’s **distribute-first** way:

\[
\begin{align*}
2(y + 20) &= 50 \\
2y + 40 &= 50 \\
\underline{2y} &= 10 \\
y &= 5
\end{align*}
\]

\[
\begin{align*}
&\text{Distributed} \underline{_______} \\
\text{Subtracted} \underline{_______} \text{ on Both} \\
\text{Divided by} \underline{_______} \text{ on Both}
\end{align*}
\]

3. Would you use Alex’s way to solve this problem on a test? **Circle one:** YES  NO

**Explain your reasoning:**
SEQ Day 1

Alex’s **distribute-first** way:

\[
\frac{1}{2}(y + 12) = 10 \\
\frac{1}{2}y + 6 = 10 \\
\frac{1}{2}y = 4 \\
y = 8
\]

- Distributed _________
- Subtracted ___________ on Both
- Multiplied by 2, the reciprocal of \(\frac{1}{2}\) on Both

4. Describe the steps Alex used for a new student in your class.
SEQ Day 1

SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work. Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[ 24 = 4(x - 1) \quad \text{and} \quad 5(x + 3) = 60 \]
Alex’s **distribute-first** way:

\[
\begin{align*}
3(n - 10) &= 33 \\
3n - 30 &= 33 \\
3n &= 63 \\
\frac{n}{\phantom{30}} &= 21
\end{align*}
\]

5. Is Alex’s way a good way to solve this problem? **Circle one:**  YES  NO

**Explain your reasoning:**
Alex’s *distribute-first* way:

\[
3(t - 1) + 3(t - 1) = 30 \\
3t - 3 + 3t - 3 = 30 \\
6t - 6 = 30 \\
6t = 36 \\
t = 6
\]

Distributed _________ 
Combined 3t’s and 3’s 
Added _________ on Both 
Divided by _________ on Both

6. Could you use Alex’s way to solve many different kinds of equations? **Circle one**: YES  NO

**Explain your reasoning:**
Alex’s **distribute-first** way:

\[
2(m + 3) + 2(m + 3) = 48 \\
2m + 6 + 2m + 6 = 48 \\
4m + 12 = 48 \\
4m = 36 \\
m = 9
\]

Distributed ___________

Combined ___________

Subtracted ___________ on Both

Divided by ___________ on Both

7. To solve \(4(y + 5) + 6(y + 4) = 42\), would Alex’s **distribute-first** step work? **Circle one:** YES  NO

**Explain your reasoning:**
SEQ Day 1

Alex’s **distribute-first** way:

\[
\frac{1}{4}(x + 8) = 5
\]

\[
\frac{1}{4}x + 2 = 5 \quad \text{Distributed ________}
\]

\[
\frac{1}{4}x = 3 \quad \text{Subtracted ________ on Both}
\]

\[
x = 12 \quad \text{Multiplied by ________ on Both}
\]

8. Why is it OK for Alex to distribute as the first step?

GP2. **Solve** the following equation using Alex’s **distribute-first** way.

\[
4(h + 2) + 3(h + 2) = 70
\]
SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work.
Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[
\begin{align*}
10 &= 2(x - 3) \\
12 &= 2(x - 4) + 2(x - 4) \\
7(x + 1) + 3(x + 1) &= 40 \\
6(f + 5) &= 120
\end{align*}
\]
PLEASE STOP HERE AND WAIT UNTIL DAY 2

Fill this part out tomorrow:

Do you have the same partner as yesterday? Please circle one. **YES or NO.**

If not, please write your new partner’s name here: __________________________________________
SEQ Day 2

Alex solved the following problems using the **distribute-first** way. Complete the step labels in the blank spaces provided below.

<table>
<thead>
<tr>
<th>Alex’s distribute-first way:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3(w + 4) = 24$</td>
</tr>
<tr>
<td>$3w + 12 = 24$</td>
</tr>
<tr>
<td>$3w = 12$</td>
</tr>
<tr>
<td>$w = 4$</td>
</tr>
</tbody>
</table>

Distributed _________  
Subtracted __________ on Both  
Divided by ________ on Both

9. Why is it OK for Alex to divide as the last step?
Alex’s **distribute-first** way:

\[
\begin{align*}
6(f + 5) &= 18 \\
6f + 30 &= 18 & \text{Distributed} \\
6f &= -12 & \text{Subtracted} \\
f &= -2 & \text{Divided by}
\end{align*}
\]

10. Would you use Alex’s way to solve this problem on a test? **Circle one:**  
YES \hspace{1cm} NO  
*Explain your reasoning:*

GP3. **Solve** the following equation using Alex’s **distribute-first** way. 
\[5(x + 3) = 25\]
Alex’s **distribute-first** way:

\[
\frac{1}{2}(x + 2) = 4 \\
\frac{1}{2}x + 1 = 4 \quad \text{Distributed} \quad \text{__________} \\
\frac{1}{2}x = 3 \quad \text{Subtracted} \quad \text{__________} \text{ on Both} \\
x = 6 \quad \text{Multiplied by} \quad \text{__________} \text{ on Both}
\]

11. Describe the steps Alex used for a new student in your class.
SEQ Day 2

Morgan solved the following problems using the **multiply/divide-first** way. Complete the step labels in the blank spaces provided below.

Morgan’s **multiply/divide-first** way:

\[
7(x - 2) = 21 \\
\frac{x - 2}{7} = 3 \\
x = 5 \quad \text{Added \_\_\_\_\_\_\_\_\_\_\_\_\_\_ on Both}
\]

12. Could you use Morgan’s way to solve many different kinds of equations? **Circle one:** YES NO

**Explain your reasoning:**
SEQ Day 2

Morgan’s **multiply/divide-first** way:

\[
\begin{align*}
4(x + 5) &= 8 \\
x + 5 &= 2 \\
x &= -3
\end{align*}
\]

*Divided by __________ on Both*

*Subtracted __________ on Both*

13. Describe the steps Morgan used for a new student in your class.
Morgan’s **multiply/divide-first** way:

\[
\frac{1}{2}(b + 4) = 6 \\
\text{Multiplied by 2, the reciprocal of } \frac{1}{2} \text{ on Both} \\
b + 4 = 12 \\
\text{Subtracted } \underline{___________} \text{ on Both} \\
b = 8
\]

14. Alex multiplied by the reciprocal of \(\frac{1}{2}\), which is 2. You could also say Alex divided both sides by \(\frac{1}{2}\). **Explain why:**

GP4. **Solve** the following equation using Morgan’s **multiply/divide-first** way.

\[
\frac{1}{3}(x - 6) = 4
\]
SEQ Day 2

SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work. Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[ \frac{1}{6}(x + 6) = 2 \]

\[ 4 = 2(n + 5) \]
SEQ Day 2

Morgan solved the following problems using the **combine-then-divide** way. Complete the step labels in the blank spaces provided below.

Morgan’s **combine-then-divide** way:

\[
\begin{align*}
2(m + 7) + 4(m + 7) &= 18 \\
6(m + 7) &= 18 & & \text{Combined (m + 7)’s} \\
m + 7 &= 3 & & \text{Divided by } \__\__\__ \\
m &= -4 & & \text{Subtracted } \__\__\__\__\__\text{ on Both}
\end{align*}
\]

15. Describe the steps Morgan used for a new student in your class.
Morgan’s combine-then-divide way:

\[
\begin{align*}
24 &= 3(h - 2) + 5(h - 2) \\
24 &= 8(h - 2) \\
3 &= h - 2 & \text{Combined} \\
5 &= h & \text{Divided by} \\
3 &= h - 2 & \text{on Both} \\
5 &= h & \text{Added on Both}
\end{align*}
\]

16. If the problem was \(8(j + 2) + 4(j + 8) = 12\), you could not use Morgan’s way. **Explain why:**

GP5. Solve the following equation using Morgan’s combine-then-divide way.

\[
3(y + 5) + 2(y + 5) = 55
\]
SEQ Day 2

Alex solved the following problems using the **distribute-first** way. Complete the step labels in the blank spaces provided below.

<table>
<thead>
<tr>
<th>Alex’s distribute-first way:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[2(x + 5) + 6(x + 5) = 16]</td>
</tr>
<tr>
<td>[2x + 10 + 6x + 30 = 16]</td>
</tr>
<tr>
<td>[8x + 40 = 16]</td>
</tr>
<tr>
<td>[8x = -24]</td>
</tr>
<tr>
<td>[x = -3]</td>
</tr>
</tbody>
</table>

17. On what types of equations might you use Alex’s way?

Give an example:
Alex’s **distribute-first** way:

\[
\begin{align*}
14 &= 4(t - 5) + 3(t - 5) \\
14 &= 4t - 20 + 3t - 15 \\
Distributed \quad &\text{__________} \\
14 &= 7t - 35 \\
Combined \quad &\text{__________} \\
49 &= 7t \\
Added \quad &\text{__________ on Both} \\
7 &= t \\
Divided \quad &\text{by \quad __________ on Both}
\end{align*}
\]

18. Why is it OK for Alex to distribute as the first step?
SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work.
Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[ \frac{1}{5}(x + 15) = 1 \quad \quad \quad \quad \quad \quad \quad 5(y + 8) = 30 \]

\[ 2(y + 6) + 3(y + 6) = 25 \quad \quad \quad \quad \quad \quad \quad 5(b – 3) + 2(b – 3) = 35 \]